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The Economics of Finishing Pigs in Hoop Structures and Confinement Facilities: A Summer Comparison

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Abstract
This report is part of an ongoing research project that is being conducted at the Iowa State University Rhodes Research Farm. This research is aimed at comparing two swine finishing facility types under a wide range of circumstances. This report provides results from a group of pigs finished during the summer season of 2000–2001. Evolution of the swine industry has forced industry members to reevaluate operations and utilize an increasing amount of risk management. A survey conducted in May 2001 showed that hoop buildings are becoming an important part of the swine industry. Hoop buildings became widely available in 1995 or 1996 and have grown to represent 4% of the market hogs finished in Iowa.

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Disciplines
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Introduction

This report is part of an ongoing research project that is being conducted at the Iowa State University Rhodes Research Farm. This research is aimed at comparing two swine finishing facility types under a wide range of circumstances. This report provides results from a group of pigs finished during the summer season of 2000–2001. Evolution of the swine industry has forced industry members to reevaluate operations and utilize an increasing amount of risk management. A survey conducted in May 2001 showed that hoop buildings are becoming an important part of the swine industry. Hoop buildings became widely available in 1995 or 1996 and have grown to represent 4% of the market hogs finished in Iowa.

Materials and Methods

The following is a report that details the sixth group of hogs, which were on test from April 18, 2000 until September 22, 2000 at the Rhodes Research Farm. Results were evaluated with the actual production numbers while using the average or typical costs for feeder pigs, feed, and average market hog prices. This allowed for comparison of expected costs and returns for normal input costs and hog price conditions. Future reports will examine the risks and efficiency of the use of capital of the two systems. Prior reports have evaluated results for previous groups of hogs raised in the hoop and confinement facilities.

Results and Discussion

Productivity. Production efficiencies have a large effect on the economics of the operation. Important information is percent of pigs marketed, feed efficiency, and average daily gain. The percent of pigs marketed also has a direct effect on the system's returns because the pigs marketed need to cover the entire system costs. The feed efficiency is calculated in this report using weight of the marketed animals at the slaughter plant and the total feed consumed by the group on test. Feed efficiency was .05 lbs/lb gain higher for the hoops than for the confinement. Feed efficiency was 2.96 for the hoop pigs and 2.91 for the confinement pigs. During this trial, the hoop facilities marketed more than a full percentage point less hogs, with 96.1% of the confinement hogs and 95.18% of the hoop hogs being marketed (Table 1).

The hogs fed in the hoop system had an average daily gain that surpassed the confinement by three hundredths of a pound a day. The hoop hogs started lighter (1.5 pounds), were on feed more than two days less, and finished almost four full pounds heavier than the confinement pigs. The confinement had nearly 9/10% higher yield than the hoops. This resulted in the hoops only marketing .65 pounds of carcass weight more per hog (189.38 vs. 188.73).

The distribution of average daily gains using the farm weight is shown in Figure 1. The graph demonstrates that the confinement system has a narrower range but a lower average daily gain. Table 2 shows the marketing of the pigs. It should be noted that the hoop pigs were brought in over a three-week period and were marketed differently than the confinement system hogs which were all placed on feed at the same time. The net result of performance and the marketing schedule shows that the hoop system turned

more than two days sooner than the confinement system or took the pigs to a higher weight in the same time period.

Economic Results. Economic results provide a comparison of costs and returns of the two production systems. Sensitivity tables provide information showing the impact of changes in selected costs, revenue, or production efficiencies such as feed price, feeder pig price, etc.

Facility costs are budgeted at $180/pig space for a confinement operation and a $55/pig space for the hoop system (Table 3). Fixed costs were calculated at 13.2% of the investment for confinement and 16.5% for hoops. The confinement facilities are depreciated over 15 years, whereas the hoops are depreciated over 10 years. Insurance and taxes represent 1.5% of the fixed investment with interest at 10% for both confinement and hoops. The confinement could turn the facilities 2.40 times a year, while the hoops could be turned 2.37 times a year.

Fuel, repairs, utilities, vet, medical, marketing, and miscellaneous costs are based on Iowa State University and Midwest Plan Service, Livestock Enterprise Budgets. Bedding for this group was 188 lbs/hog marketed with a cost of $20/1200 lbs. Labor was valued at $10.00/hr, with .2 hrs/head in the confinement hogs and .27 hrs/head for the hoop hogs. Feed prices were set at $.06/lb, which is a typical average price with grind, mix, and delivery included. All the feed used was applied only to the pigs that were marketed.

Feeder pig as well as market hog prices were calculated using a rounded average price from 1990 to 1999. The feeder pig prices then take into account costs from dead or culled pigs as well as a 10% interest rate that is counted against all expenses except labor and marketing costs. Market hog prices were switched to carcass weight basis in order to take into account the yield differences and lean premiums. The yield premiums for the confinement pigs was .87%, and the lean premium was $.11/carcass hundred weight based on sales to Excel. It should be noted that the lean premiums would vary depending on the packer used. The revenue from the culled hogs was estimated as half the revenue from a marketed hog/cwt live weight.

The result of the trial is that, for this summer group, net revenue was $1.69/pig marketed greater for the hoop system the net cost was $1.51 lower/pig marketed in the hoop system (Table 3). Operating costs, was $5.06/pig greater in the hoop system, while fixed costs were $5.67 lower/pig. Bedding and feed cost differences were the largest differences in operating costs, representing $3.15 and $1.88 differences in favor of the confinement respectively. The hoop system received an additional $.19 in revenue/pig. The revenue was calculated by using the carcass weight of the average pig for each facility type on trial and multiplying it by the average value/carcass weight received from 1990 to 1999, $60 (rounded to the nearest dollar). The confinement also had $.11/carcass hundred pounds added value due to the lean premium advantage over the hoop system.

Table 1. Productivity information table.

	Hoop	Confinement	Difference
Total pigs started	456	132	
Start weight	35.5	37.0	1.5
Culls	15	2	13
Cull rate	3.29%	1.52%	1.77%
Death	7	3	4
Death loss %	1.54%	2.27%	-0.74%
Average daily gain*	1.60	1.57	0.03
Total days	60060	17272	
Total Feed	283519	79008	
Feed efficiency*	2.96	2.91	0.05
Farm sale weight	255.9	254.5	1.4
Plant sale weight	252.6	248.9	3.7
Yield	74.96%	75.84%	0.88%
Hot carcass weight plant	189.38	188.73	0.65
Average days on feed	138.33	136.00	2.33
Facility days	146.33	144.00	2.33
Percent pigs marketed	95.18%	96.21%	-1.04%
Pigs marketed	434.00	127	

*Using plant sale weight

Table 2. Marketing information.

	Hoop Pigs Marketed	Confinement Pigs Marketed	Hoop Percent Marketed	Confinement Percent Marketed
09/08/00	111	78	24.94%	61.42%
9/22/00		49		38.58%
8/22/00	188		42.25%	
8/26/00	73		16.40%	
9/15/00	73		16.40%	
Total	445	127	100%	100%

Table 3. Group seven swine grow finish production budget.

Item	Hoop	Confinement	Difference
Facility investment			
Building (per pig space)	$55.00	$180.00	-125
Feed and manure handling	$36.00	$36.00	0
Total initial investment	$91.00	$216.00	-125
2.6 Turns/Year final day out + 8 days	2.37	2.40	-0.04
Total initial investment per turn	$38.48	$89.95	-$51.47
Fixed cost			
% Interest, taxes, depreciation, insurance	16.5%	13.2%	
Facility cost per hog marketed	$6.67	$12.34	-$5.67
Fixed cost per CWT marketed	$2.64	$4.96	-$2.32
Operating costs			
Feeder pigs	$38.00	$38.00	$0.00
Feeder pig death loss	$2.56	$2.13	$0.43
Interest on feeder pig	$1.33	$1.27	$0.06
Fuel repairs utilities	$1.05	$1.04	$0.01
Bedding	$3.15	$0.00	$3.15
Feed ($.06/lb)	$39.21	$37.33	$1.88
Vet/Med.	$1.58	$1.56	$0.02
Interest on mixed costs	$0.79	$0.69	$0.10
Labor	$1.50	$1.50	$0.00
Marketing costs	$2.84	$2.81	$0.03
Total operating cost	$91.38	$86.32	$5.06
Operating costs/CWT marketed	$36.17	$34.69	$1.49
Total cost (per pig marketed)	$98.05	$98.66	-$0.61
Total cost per CWT*	$38.81	$39.65	-$0.83
Revenue from cull pigs per head	$1.66	$0.76	$0.90
Net cost (per pig marketed)	$96.40	$97.91	-$1.51
Net cost per CWT*	$38.16	$39.34	-$1.19
Lean premium difference (Per hot CWT)		$.11	-$.11
Revenue from $60 per hundred carcass weight**	$113.63	$113.44	$0.19
Net revenue per hog marketed	$17.23	$15.54	$1.69

* Uses plant sale weight

** Confinement revenue includes the $.11 per CWT premium as well as the yield premium.

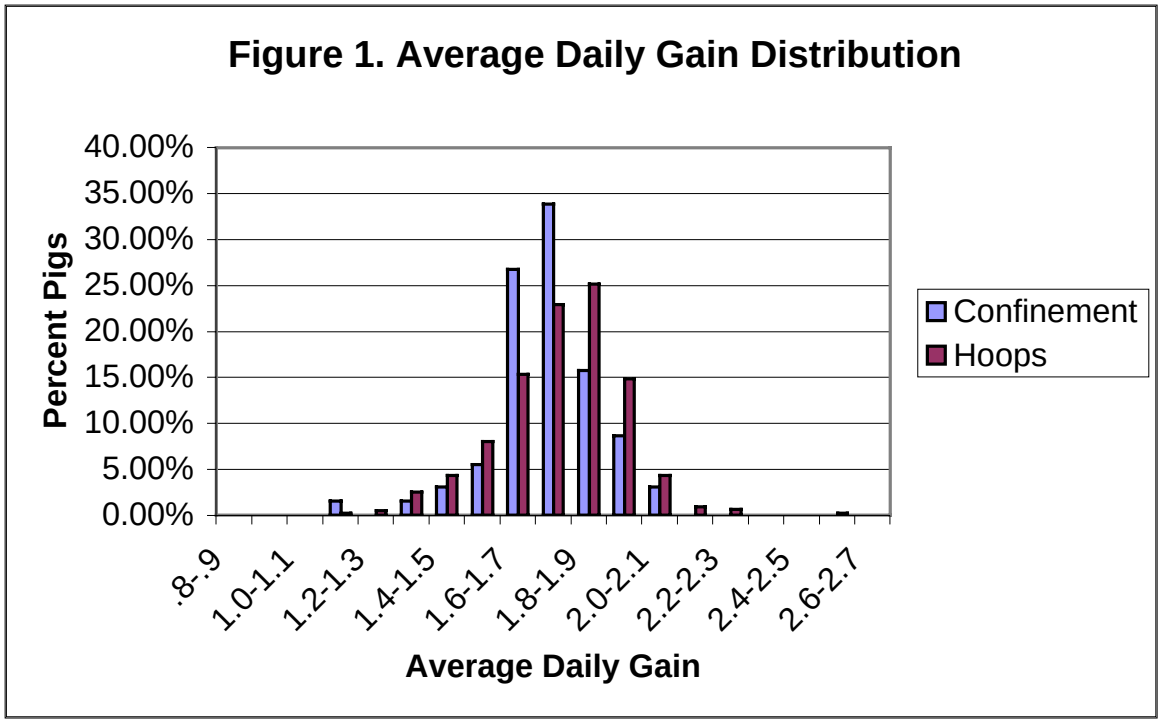
Figure 1. Average Daily Gain Distribution
40.00%
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
Percent Pigs
.8-.9
1.0-1.1
1.2-1.3
1.4-1.5
1.6-1.7
1.8-1.9
2.0-2.1
2.2-2.3
2.4-2.5
2.6-2.7
Average Daily Gain
Confinement
Hoops